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## Nature-Based-Learning for Students with Disabilities

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**Nature-Based-Learning for Students with Disabilities**

by

Graham Newman

A Starred Paper

Submitted to the Graduate Faculty of

St. Cloud State University

in Partial Fulfillment of the Requirements

for the Degree

Master of Science

in Special Education

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## Table of Contents

Chapter	Page
1. Introduction.....	4
Research Question.....	5
Focus of the Paper.....	5
Importance of Topic.....	6
Historical Background.....	7
Definition of Terms.....	7
2. Review of Literature.....	10
Modern Youth May be Detached from Nature.....	11
The Rise of ADHD, Mental Health Challenges, and Obesity in Children.....	14
Positive Aspects of Nature-based-learning.....	16
Nature-based-learning’s Impact on Mental Health and Physical Health.....	17
Nature-based-learning’s Impact on Cognitive Health and Academics.....	18
Nature-based-learning’s Impact on Global Citizenship, Morals Empathy, and Connectedness to Nature.....	18
Examples of Nature-based-learning for Students with Disabilities.....	19
Chapter 2 Summary.....	23
3. Conclusions and Recommendations.....	25
Recommendations for Future Research.....	27

Chapter	Page
Implications for Current Practice.....	27
Summary.....	29
References.....	30

## Chapter 1: Introduction

Time spent in nature benefits individuals of all ages mentally, physically, and emotionally (Wilson, 2014). As time passes, however, nature seems to be less and less a part of our education and daily life. However, schools can adopt nature into their curriculum to meet a variety of needs. Nature based learning (NBL) takes students to a natural environment during class time, such activities are referred to as learning in nature. NBL may offer particular benefits to students with behavior disorders and other disabilities.

Youth in the United States are more alienated from nature than ever in the past (Louv, 2008). According to the National Recreation and Park Association, American children only spend an average of four to seven minutes outside engaged in outdoor play; by comparison, American children use electronic devices for 7.5 hours (Dolesh, 2012). Nature has been pushed aside in the American educational system because of increased pressure to improve academic performance due to new laws and regulations, reduced recess time, and more technology integration that have prioritized over time spent outdoors. Perhaps ironically, as we are beginning to understand the importance of recess and outdoor time in the life of school children, we see evidence that many schools are reducing those breaks in favor of more instructional time (Dowdell, Gray, & Malone, 2011). As federal and state governments have pushed for higher test scores in recent years, nearly 40% of American elementary schools either eliminated or were considering eliminating recess, as many districts considered recess a waste of potential academic time (Louv, 2008). State standards are guidelines which specify desired learning and development outcomes for students of a given age, but most of these

standards-based policies underutilize the outdoor learning environment and nature inquiry (Cooper, 2015). Research supports the integration of nature in educational settings. Time spent in nature can help students connect with the world around them and with other people (Prabawani, Hanika, & Pradhanawati, & Budiatmo. 2017).

Schools may benefit from taking steps to increase nature exposure (Windhorst & Williams, 2016). Nature education enables students to interact in an environment free from the limitations of the classroom. For special education students, a natural setting outdoors for learning might be worth exploring.

### **Research Question**

One research question guides the review of the literature. I examined whether nature-based-learning methods benefit students with disabilities.

### **Focus of the Paper**

This paper explores the potential of nature-based learning to positively impact students with disabilities. It also explores NBL's potential to contribute to the mental health and physical health of students. A review of literature in Chapter 2 identifies and analyzes existing information about nature-based learning in a comprehensive way. The first part of Chapter 2 provides an overview of NBL and discusses how and why today's children may be detached from nature, and the negative aspects of this detachment. The second part of Chapter 2 explores positive impacts of NBL and hones-in on its potential for students with disabilities. Finally, nature based-learning's effects are provided in discussions and examples from schools across the nation. Chapter 3 summarizes the findings, recommends topics for future research on NBL, and addresses the implications for current practice on NBL.

## **Importance of Topic**

In the 21<sup>st</sup> Century, humans seem to be losing their bond with nature (Sailakumar & Naachimuthu, 2017). American children spend hours of their time on electronic devices at school and continue these behaviors when they get home. Research has also linked too much screen-time and lack of exposure to nature to anxiety, depression and obesity, Wilson (2014, p. 46) argues nature has been “clinically proven to enhance children’s growth and development, cognitive abilities, creativity, problem-solving skills, physical health, social relationships, self-discipline and reduce their stress”.

Nature improves self-confidence, self-esteem, empathy, test scores, and connection to others in all children, not only those with special needs (Louv, 2008). When comparing time spent stuck indoors versus time spent outside, the behavior of students with disabilities changes completely. Research shows a decrease in behavioral outbursts, while the inability to pay attention and the lack of interest turn around in a positive way (Wilson, 2014). One study of 15 residential summer camp programs with specialized instruction for children with a range of disabilities revealed that participating children demonstrated improved initiative and self-direction that transferred to their lives at home and in school (Louv, 2008). When children are given time to be in a natural setting for both structured and unstructured times, they often become calmer and engaged (Martin, Farrell, Gray, & Clark, 2018). Nature-based educators work with students with poor self-concept, special education students, low-achieving students, students at risk for depression, and students with truancy or behavioral problems (Haynes & Gallagher, 1998). Nature-based learning is designed to give students a more well-rounded approach to their education.

## Historical Background

Over time, the amount of time students of all ages spend outdoors during the school day has decreased (Martin et al., 2018). Schools want to increase academic performance, but this has meant that unstructured time centered around imagination, play, and time outdoors is becoming more and more limited.

In the last several years, technology has also played a major role in education. This role has well surpassed basic online computer research and word processing. Today, thousands of schools across the country have developed one-to-one initiatives using mobile devices, making a large percentage of learning less hands-on. As education becomes more digital, it also becomes more centered on staying indoors.

## Definition of Terms

**At-risk students (High-needs student):** This refers to students who are at risk of educational failure or otherwise in need of special assistance and support, such as students who are living in poverty, who attend high-minority schools (as defined in the Race to the Top application), who are far below grade level, who have left school before receiving a regular high school diploma, who are at risk of not graduating with a diploma on time, who are homeless, who are in foster care, who have been incarcerated, who have disabilities, or who are English learners (United States Department of Education Website, 2006).

**Attention Deficit Hyperactivity Disorder (ADHD):** Inattention, hyperactivity and impulsivity are the core symptoms of Attention Deficit Hyperactivity Disorder (ADHD). When children exhibit behaviors associated with ADHD, the consequences may include difficulties with academics and with forming relationships with their peers if appropriate



instructional methodologies and interventions are not implemented (United States Department of Education Website, 2006).

**Emotional or Behavior Disorders (EBD):** This refers to students identified as exhibiting emotional or behavior disorders who need specialized services for emotional or behavioral support for a wide range of complex and challenging emotional or behavioral conditions. Medical, biological, and psychological conditions as well as genetic dispositions can affect these students' ability to learn and function in school (Minnesota Department of Education, 2015).

**Nature-based learning (NBL):** NBL refers to learning through exposure to nature and nature-based activities and occurs in natural settings and where elements of nature have been brought into environments, such as plants, animals, and water (Jordan & Chawla, 2019).

**Special education:** Students in special education have a disability and are in need of specialized instruction to help them succeed in school. Some of the disability categories include Autism Spectrum Disorder (ASD), Developmental Cognitive Disability (DCD), Emotional Behavior Disorder (EBD), Other Health Disability (OHD), and Specific Learning Disability (SLD). For every student who needs special education services, the team develops a special document called an Individualized Education Program (IEP), which is a personalized education plan to help students with disabilities succeed in school. The IEP outlines the unique needs of the student and the specialized goals and objectives that will help the student make educational progress (Minnesota Department of Education, 2015).

## Chapter 2: Review of Literature

Louv (2008) argues that nature-based-learning (NBL) is not a new concept. He says that time spent in nature is not necessarily leisure time, but rather it is an essential investment in our children's health. True NBL is when nature *is* the classroom (Chawla, 2018). NBL, or learning through exposure to nature and nature-based activities, occurs in natural settings and where elements of nature have been brought into environments, such as plants, animals, and water (Jordan & Chawla, 2019). Gautheron (2014) offered the following definition of NBL: Nature-based learning consists of taking students to a natural environment during class time, or what is also referred to as learning *in* nature. Nature-based learning is often grouped with similar concepts such as place-based education, environmental education, outdoor education, and environment-based education (Louv, 2008).

Even if there are subtle differences among them, they all emphasize a hands-on, nature centered approach to learning. NBL aims to activate more senses than just sight and sound, as is often done in the classroom, by engaging learners with the natural world (Gautheron, 2014). It includes the acquisition of knowledge, skills, values, attitudes, and behaviors in areas like academic achievement, personal growth, and environmental consciousness. It also includes learning about the natural world, but extends to engagement in any subject, skill or interest while in natural surroundings (Jordan & Chawla, 2019).

Examples of nature could be a forest, a grass field, a pond, city parks, or trees that line city streets. In schools, educators could have the class read a book, write a story, or study biology while lying on a patch of grass, activating their senses of smell,

touch and sound while connecting learning with the nature surrounding them. NBL includes informal learning, like simply playing on a green schoolyard, as well as formal learning when children have contact with nature during structured activities in schools, childcare centers, and outdoor field trips (Jordan & Chawla, 2019).

### **Modern Youth May be Detached From Nature**

Children in the United States are increasingly disconnected from nature (Sailakumar & Naachimuthu, 2017). Coinciding with this disconnect, we are also seeing an upswing in childhood health and behavioral problems (Grimwood, Gordon, & Stevens, 2018). Louv (2008) states that at the same time the bond is breaking between the young and the natural world, a growing body of research links our mental, physical and spiritual health directly to our association with nature-in positive ways. Research supports that less time outdoors is linked to depression, attention disorders, and obesity in children (Dowdell et al., 2011). Research also supports the link between less outdoor time and the difficulties children face with depression, obesity and behavioral and learning disorders (Sailakumar & Naachimuthu, 2017).

Even though there is evidence supporting the importance of nature to the overall well-being of children, current trends in education limit access to nature. Richard Louv (2008) writes about how today's children can likely explain details of the Amazon Rainforest, but not about the last time they took a walk in the woods or watched the clouds move. He calls this phenomenon "nature deficit disorder", which describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses.

Clements (2004) claims that children today spend less time playing outdoors than their mothers did when they were young. She and her colleagues surveyed 800 mothers, whose responses were compared to the views of mothers interviewed a generation ago: 71% of today's mothers said they recalled playing outdoors every day as children, but only 26% of them said their kids play outdoors daily.

Additionally, modern youth's detachment from nature may be correlated with less recess time at school. Louv (2008) discusses how recess has slowly been phased out of the school system. In the first decade of the 21<sup>st</sup> century, due to a push for higher test scores and a fear of liability, forty percent of schools in the United States have been eliminating or considering eliminating recess (Louv, 2008). Technology, such as television, video games, smart phones, and other forms of electronic media, are now often used as entertainment by children instead of playing outside. The National Recreation and Park Association claims that American children only spend an average of four to seven minutes outside engaged in outdoor play, which is compared to a daily average of 7.5 hours on electronic devices (Dolesh, 2012). According to Kimbell et al. (2009), this technology-driven lifestyle is deteriorating children's connection with the land.

As the reliance on technology has increased in both education and at home, many students choose to spend time inside playing video games, using smartphones, watching TV, or using social media instead of being outside. Hofferth (2009) reports that American children are increasingly spending less time playing outdoors or in any form of unstructured play. She notes a 50% decline in the number of children aged 9 to 12 that spend time outside engaged in activities like hiking, walking, fishing and gardening.

Despite evidence that NBL can make a positive contribution towards students' learning, the move away from nature-based learning is being seen in the funding priorities of school boards and districts. Technology is a growing interest in many schools, and some school board officials see nature and technology as opposing forces. In their way of thinking, a choice must be made between funding technology or funding concepts like NBL (Louv, 2008).

In response to various legislative acts such as NCLB and ESSA, schools have felt more pressure to increase academic performance which often leads to reduction or actual elimination of activities like recess and unstructured outdoor play (Martin et al., 2018). As a result, the push for developing young students' skills in preparation for university and job prospects has led to a reduction in free play in favor of student's participation in extracurricular activities and the completion of school obligations such as homework (Dowdell et al., 2011). Montana (2017) argues

Outside time is at a minimum and way too much time at both home and school is spent planted in front of a screen. This lack of exposure to nature prevents children from developing the curiosity and appreciation for green space, insects, animals, and plants that are crucial in inspiring them to become the future stewards of our planet. (p. 1)

As screen time increases and outdoor time decreases, we see an increase in mental and physical health challenges (Louv, 2008).

### **The Rise of ADHD, Mental Health Challenges, and Obesity in Children**

The less time children spend outdoors, the more likely they may be to have deficits in physical, intellectual and emotional development and learning (Louv, 2008).

According to historian and social critic Theodore Roszak, “separation anxiety disorder means excessive anxiety concerning separation from home and from those to whom the individual is attached (Louv, 2008). But according to Louv, no separation is more pervasive in this age of anxiety than our disconnection from the natural world. Nature-based learning, however, can help students gain resilience. NBL leads to greater student achievement and reduces inattention and impulsivity (Kiser, 2015). “In adapting to the ever-changing, often unpredictable natural world, they learn to cope and problem-solve” (Kiser, 2015, p. 288).

As coping and problem-solving skills decrease, ADHD and their medications are on the rise. Louv (2008) cites an article entitled *Behavior Drugs Top Kids' Prescriptions*, by Linda A. Johnson of the *Associated Press*, stating that between 2000 and 2003, spending on ADHD for preschool children increased by 369%. From 2006 to 2011, ADHD diagnoses increased at a rate of five percent per year, and research shows nature-based learning may help in treatment versus prescription medications (Cooper, 2015). Adderall and Ritalin are commonly prescribed medications and are usually effective, but they also have side effects like heart problems, stomach pain and anxiety (Dineen, 2017). Richard Louv referenced a 2004 article called *Think Beyond Drug Therapy for Treating ADHD* written by Victoria Stagg Elliot, which claims “although our current medication for ADHD can offer temporary gains, they may do little for a child’s long-term social and academic success”. According to the National Institute of Mental Health, these medications can also have side effects including sleep disruption, depression and growth suppression (Louv, 2008). A 2017 study conducted by

Sailakumar and Naachimuthu states "...Kids who don't get nature-time seem more prone to anxiety, depression and attention deficit disorders" (p. 187).

The concept of nature-deficit disorder, according to Richard Louv, is appropriate and useful as a layperson's description of one factor that may aggravate attentional difficulties for many children. According to the National Wildlife Federation (NWF), the United States has become the largest consumer of ADHD medications in the world, and pediatric prescriptions for antidepressants have risen dramatically (Martin et al., 2018). A 2003 survey published in the journal *Psychiatric Services* found the rate at which American children are prescribed antidepressants almost doubled in five years; the steepest increase, at 66%, was among preschool children (Delate, Gelenberg, Simmons, & Motheral, 2004).

### **Positive Aspects of Nature-based-learning**

We know there is a link between mental/physical health and exposure to nature. "Child psychologists and psychotherapists are now convinced that contact between children and the natural environment is essential to ensure their balanced psychological and physical development as adolescents and adults" (Sailakumar & Naachimuthu, 2017, p. 189). Research has linked too much screen-time and lack of exposure to nature to anxiety, depression, and obesity, while nature has been "clinically proven to enhance children's growth and development, cognitive abilities, creativity, problem-solving skills, physical health, social relationships, self-discipline, and reduce their stress" (Wilson, 2014). In Cooper's 2015 study, *Nature and the Outdoor Learning Environment* from the *International Journal of Early Childhood Environmental*

*Education*, research showed that outdoor learning and play time in nature enhances the health and development of children including self-regulation, gross motor skills, cognitive development, academic performance and self-confidence. Furthermore, in 2010, a report from the White House Task Force on Childhood Obesity sent to the President stated that children's level of physical activity increases when they participate in environmental education programs that promote outdoor activity. Children of all ages are healthier, happier and have better social skills if they have frequent opportunities for free and unstructured play outdoors" (Wilson, 2014). Even with this research, many teachers still have limited perceptions of the importance of nature in education. Therefore, it may be necessary that we as educators alter our mindsets and understand the importance of nature into a well-rounded, hands-on approach to learning.

### **Nature-based-learning's Impact on Mental Health and Physical Health**

Hattie, Marsh, Neill, and Richards (1997) report that participants in adventure-therapy programs made improvements in self-esteem, leadership, academics, personality, and interpersonal relations. These changes were shown to be more stable over time than the change generated through more traditional education programs (Hattie et al., 1997). According to one study they examined, an increase in self-esteem was most pronounced for preteens, but was positive across all ages (Hattie et al., 1997).

In addition, two major studies, "Gaining Ground" (Dyment, 2005) and "Grounds for Action" (Dyment & Bell, 2007) were conducted in schools across Canada. Researchers there found that children who experienced school grounds with diverse natural settings were more physically active, had an increased awareness of nutrition



and civility toward one another, and were more creative. In *Last Child in the Woods*, Richard Louv references James Sallis, program director of the Active Living Research Program for the Robert Wood Johnson Foundation, who claims, “Based on previous studies, we can definitely say that the best predictor of preschool children's physical activity is simply being outdoors and that an indoor, sedentary childhood is linked to mental health problems” (Louv, 2008).

### **Nature-based-learning’s Impact on Cognitive Health and Academics**

Nature-based learning is likely to benefit the mental health of all students, and it can also be used to increase cognitive health and improve academics (Jordan & Chawla, 2019). Cognitive benefits of contact with nature have been identified by various studies and indicate that nature improves awareness, reasoning, observation skills, creativity, concentration, and imagination (Dowdell et al., 2011). Taylor and Kuo (2006) argue that children have greater ability to concentrate in more natural settings.

Academically, studies show that American schools using outdoor classrooms and other forms of nature-based education show significant student gains in social studies, science, language arts, and math (Cooper, 2015). Sobel (2005) reports that fourth grade students at a nature-based-learning school in Asheville, North Carolina attained higher percentages of proficient ratings on academic tests than traditional schools. Gerald Lieberman (1998) found that environment-based education produced student gains in social studies, science, language arts, and math. Results also showed improved standardized test scores and grade point averages, as well as development of

skills in problem solving, critical thinking and decision-making skills (Lieberman & Hoody, 1998).

### **Nature-based-learning's Impact on Global Citizenship, Morals, Empathy, and Connectedness to Nature**

Frantz and Mayer (2014) found that when a sense of belonging to the environment is high, empathy and the desire of individuals to help protect the environment increases. Ideally, the substance of environmental education is the ability to provide knowledge and skills in environmentally friendly practices and is attached to each student's attitude and personality, not merely for academic achievement (Prabawani et al., 2017).

Research has also shown that green school grounds can enhance learning and suit a wide array of students. Nature has also helped foster more social inclusion regardless of gender, race, class or intellectual abilities (Dyment & Bell, 2007). When students are engaged in their education and find it meaningful to their daily lives, learning and exploration becomes lifelong.

Nature-based-learning can also provide stimulation of the senses at a greater level than provided by an indoor classroom (Gautheron, 2014). Visual and auditory are the primary senses that are stimulated in an indoor classroom, but nature has potential to engage all the senses and awareness of the world. Outdoor learning environments provide students with opportunities to care for living things and appreciate nature and beauty. In particular, outdoor learning environments with non-toxic trees and shrubs, topographic variations (such as mounds, terraces, slopes), a variety of ground surfaces (mulch, grass, pebbles, rocks, wood), non-poisonous flowering plants or garden

vegetables, birdfeeders, and birdhouses can enhance connections with nature (Cooper, 2015).

### **Examples of Nature-based-learning for Students with Disabilities**

Through a nature-based learning approach, learning can be more personal and individualized, which is exactly the purpose of special education. While nature-based learning can help all students build citizenship, diversity and responsibility, it may be particularly effective for students with EBD and/or ADHD. Research shows that the calming environment nature provides can reduce symptoms of ADHD in children (Sailakumar & Naachimuthu, 2017). Studies of outdoor education programs geared toward troubled youth, especially those diagnosed with mental health problems, show a therapeutic value (Hattie et al., 1997). Nature-based learning may be an opportunity for students with EBD, ADHD, and other types of disabilities to be more successful in school. When comparing time spent indoors versus time spent outside, the behavior of students with disabilities changes. Research shows a decrease in behavioral outbursts, while the inability to pay attention and the lack of interest turn around in a positive way (Wilson, 2014). For special education students, a change in the environment to the outdoors can facilitate learning by removing them from the classroom setting which they may already identify with failure (Lappin, 1984). NBL may also provide a chance for students with disabilities to identify and meet their own personal goals.

Safety may be one of the most important components for educating students with EBD and ADHD, along with other types of disabilities. All students need to feel safe at school, but for those with disabilities, especially behavior issues, feelings of safety and security trump everything else. Students with disabilities, especially those with

diagnoses of Emotional or Behavior Disorder, Autism and ADHD often require a calm approach to situations. School can be highly stressful and fast-paced. Safety is one of the most basic human needs, and if students with emotional and behavioral needs in particular do not feel safe, then learning cannot take place; they are in survival mode and everything else is irrelevant.

Nature, however, can help with the sense of security, among other needs. According to a 2017 study conducted by Anderson, Trinh, Caldarella, Hansen, and Richardson, students with emotional and/or behavior issues often display unacceptable social behaviors and have difficulty performing well academically. However, research done on outdoor education programs for students with behavior disorders yield a number of other positive findings, including improvement in self-concept, social adjustment, academic achievement, and group cohesion (Lappin, 1984).

Coping and problem-solving skills are also important for students with emotional or behavioral disorders. Chawla (2018) notes that EBD students report a greater sense of energy and happiness and less stress and anger after a day in the forest.

In addition, field trips that emphasize nature study, environmental education and awareness, conservation of natural resources, local history, community services, and physical and health education can also be learning experiences for students with emotional and behavior disorders. Students with behavior issues can benefit from activities that offer a challenge. Camping, hiking, rock climbing, rappelling, canoeing, rafting, and backpacking are all activities that can be adapted to the novice and do not require exceptional physical ability. Nature-based activities such as these challenge students, but also give them a chance to push themselves and identify strengths they

may not have otherwise learned (Lappin, 1984). This may be an opportunity for children, especially those with disabilities, to realize that learning and growth can also take place in areas outside of a traditional classroom.

Also, natural settings have effectively been shown to reduce ADHD symptoms, and schools with environmental education programs score higher on standardized tests in math, reading, writing, and listening (Martin et al., 2018). Chawla (2018) supports integrating nature and unstructured play back into the curriculum to reduce inattention and impulsivity while increasing student achievement. Cooper (2015) reports that previous research has linked outdoor play like recess to helping elementary students focus better in the classroom and reducing symptoms of Attention Deficit Hyperactivity Disorder.

Martin et al. (2018) report that when school administrators added three additional recess times throughout the day, teachers and parents indicated they could observe the benefits of additional recess time. Even though teachers were initially hesitant to give up additional instructional time during the day, they saw positive benefits in their students such as increased attention in class, improvements with following directions, and reductions in disciplinary issues. Parents also saw benefits extending beyond the classroom. As a result, school administrators plan to expand four recess periods to more grade levels. Participants in this study also emphasized the importance of recess in a child's social and cognitive development, problem-solving skills, strengthening of relationships, and working together.

Nature-based programs have also seen improvement in attendance and behavioral issues than students in traditional classrooms. Little Falls High School in

Little Falls, Minnesota reported that students in the environment-based program had 54% fewer suspensions than other 9th graders (Sobel, 2005). At Hotchkiss Elementary, teachers had once made 560 disciplinary referrals to the principal's office in a one year. Two years later, after the implementation of the environment-based program, the number dropped to 50 (Sobel, 2005).

Additional studies have shown that nature-based education can be a positive behavior support for students. The American Institute for Research (2005) released a report on 255 at-risk sixth-grade students from four elementary schools who attended three different outdoor education programs over a period of several months. The study compared the impact of students who experienced the outdoor education program versus those in a control group who had not had the outdoor learning experience. The findings of the study included a 27% increase in measured mastery of science concepts, improved cooperation and conflict resolution skills, gains in self-esteem, problem solving, motivation to learn, and classroom behavior. Elementary school teachers and outdoor staff emphasized how outdoor science school provided a fresh start for students (Levine, Hikawa, Agosta, & Doyal, 2005).

## **Chapter 2 Summary**

Nature-based-learning is learning through exposure to nature and nature-based activities in a natural setting. It can be tied into any subject and may be beneficial for students, and in particular, students with disabilities. Potential benefits of NBL include improvements with mental health, physical health, cognitive abilities, academic abilities, problem-solving, creativity, self-confidence, self-discipline, attention, behavior, and stress reduction. Despite the positive aspects of NBL, modern youth seem to be

spending less time in nature in schools and at home. Incorporating NBL back into school programming may be an avenue for supporting children and teens to be more successful in school and their lives.

### **Chapter 3: Conclusions and Recommendations**

Nature-based learning can be beneficial to students, especially to those with disabilities. Nature-based learning includes learning about the natural world, but it also extends to engagement in any subject, skill or interest while in natural surroundings. Examples of places where nature-based-learning can take place include forests, grassy fields, a patch of grass, lakes, ponds, rivers, streams, city parks, and trees that line city streets.

Children are increasingly disconnected from nature (Sailakumar & Naachimuthu, 2017). Coinciding with this disconnect, we are also seeing an increase in childhood health and behavioral problems. Many of our educational practices focus on technology and screen-time, increased academic instruction, class size, student achievement and success. However, nature is often left out of the conversation.

Children who spend less time outdoors are more likely they may be to have deficits in physical, intellectual and emotional development and learning. ADHD, anxiety, and depression diagnoses for youth of the United States are on the rise (Louv, 2008). The United States is the largest consumer of ADHD medications in the world, and prescriptions for antidepressants are on the rise. Obesity rates for children have also increased. These increases in ADHD, anxiety, depression, and obesity for children have occurred simultaneously with the detachment of schools and children's home lives with nature.

Besides increased mental acuity and concentration, there are many additional benefits of nature exposure. Nature can enhance children's growth and development,



cognitive abilities, senses, creativity, problem-solving skills, physical health, social relationships, self-discipline, and reduce their stress. Research has also shown that outdoor learning and play time in nature enhances the health and development of children including self-regulation, gross motor skills, cognitive development, academic performance and self-confidence (Louv, 2008). Exposure to nature promotes relaxation, increases fitness abilities, and provides Vitamin D (Windhorst & Williams, 2016). Cognitive benefits of contact with nature have been identified by various studies and indicate that nature improves awareness, reasoning, observation skills, creativity, concentration, and imagination (Jordan & Chawla, 2019). Academically, studies show that American schools using outdoor classrooms and other forms of nature-based education show significant student gains in social studies, science, language arts, and math.

Nature-based learning can be helpful to all students, but NBL may be particularly beneficial for students with disabilities. Students with a variety of challenges often show academic growth, improved behavior, and report positive feelings when exposed to nature-based and experiential learning opportunities outside. Research shows that the calming environment nature provides can reduce symptoms of ADHD in children. Nature-based learning may also be an opportunity for students with EBD, ADHD, and other types of disabilities to be more successful in school. When comparing time spent indoors versus time spent outside, the behavior of students with disabilities changes, usually for the better. Nature-based learning can lead to a decrease in behavioral outbursts, while the inability to pay attention and the lack of interest turn around in a

positive way. These are just a few of many benefits regarding nature-based learning for students with disabilities.

### **Recommendations for Future Research**

Although evidence is accumulating for the impact of nature-based learning (NBL) on children's outcomes, there still is much we do not know. We need more studies showing that nature helps healthy childhood development and to further document the connection between outdoor learning, classroom-based environmental education and academic achievement and stewardship behavior. Nature-based learning programs should be studied in order to understand the changes in behaviors and academics among all students, especially those with special needs in comparison to what happens when children are not exposed to nature. Both qualitative and quantitative studies of nature-based learning are needed. In my literature review, the majority of information I found was from qualitative studies. This lack of quantitative data on nature-based learning is one of the biggest limitations in the research.

### **Implications for Current Practice**

Nature-based-learning can be added to all subject areas, and there are many opportunities for cross-curricular education. It is important to match growing evidence of benefits of learning in nature with outreach to teachers, school administrators, school boards, schools of education, childcare center directors and people in other institutions who have opportunities to apply nature-based approaches. Instead of seeing nature and outdoor time as non-academic, maybe we need to regard time spent outdoors as an

opportunity to teach hands-on, relevant skills and educational standards in cross-curricular lessons like weather patterns, seasons, and life cycles of plants and animals.

For school districts, the process of beginning a nature-based program does not have to be difficult. Simple steps can be taken to engage students with nature. Educators can implement nature-based learning simply by having the class reading a book, writing a story, or studying biology while lying on a patch of grass, activating their senses of smell, touch and sound while connecting learning with the nature around them. Nature walks, where a teacher can relate interesting stories of the natural fauna and flora, habitats of birds and animals, are invaluable and can be incorporated into local history and science classes. Schools can also invest in creating “school gardens” with fruits and vegetables, a diverse selection of plants and habitats representative of local flora and fauna, birdfeeders, and birdhouses. This is an efficient way to create cross-curricular lessons and bring math, science, art and history into hands-on teaching. By integrating gardening into daily experiences for students at school, students can build a deep curiosity about, and respect for nature.

## **Summary**

Nature-based learning is a valuable interaction with the natural environment that teachers can easily provide to students with disabilities. Because of the potential benefits of nature-based learning for special education students, perhaps even all students, I believe that NBL is worth implementing in schools. Nature is an abundant resource and is worth the investment for the sake of our future generations. As a special education teacher, I would love to incorporate nature-based-learning into my teaching. I

envision starting with something simple and informal, like planting a few trees, planting a small garden, teaching a lesson outside, or doing a writing exercise about a short hiking excursion. At some point, I would like to collect data on my trials. Eventually I could implement a study about nature-based learning. I feel the potential of nature-based learning is hard to ignore and the positive effects it can have on my students and myself as a teacher make it a worthwhile endeavor.

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